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10/574,640	03/31/2006	Robert Bruce Grant	M03B177	1874

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EXAMINER	
OLSEN, KAJ K	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,640	GRANT, ROBERT BRUCE	
	Examiner	Art Unit	
	KAJ K. OLSEN	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 3/31/2006.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: The specification needs to open with a paragraph stating that this application is a 371 National Stage application for PCT/GB2004/004122 filed on 9/23/2004.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 7, 8, 11, 13, 16, 17, 19, and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. With respect to claim 7, it is unclear how to interpret the combination of claims 1 and 7. In particular, claim 7 states that the sensor further comprises a counter electrode, which is presumably in reference to the embodiment of fig. 2 where a counter electrode is added to the sensor. This embodiment connects the means for controlling the electrical current through this counter electrode. The problem is that claim 1 required the means for controlling the electrical current to be connected between the measurement electrodes and the reference electrode. Hence, claim 7 either lacks enablement because the applicant did not teach an embodiment having both

a counter electrode and where the means for controlling current is connected to the reference electrode, or one would have to ignore the requirement of claim 1 that the means for controlling the current be connected to the reference electrode and presume the means for controlling the current is actually now connected elsewhere. For the sake of examination, the examiner will presume the latter, but this is indefinite because dependent claims can only further narrow an independent claim and cannot remove or disregard limitations earlier set forth in the independent claims. The examiner recommends the applicant draft a separate independent claim for the embodiment of fig. 2 and correctly set forth that the means for controlling the electrical current is connected to the counter electrode for that claim.

5. Claim 16 is similarly indefinite. Claims 8 and 17 depend from these indefinite claims and are likewise indefinite.

6. In claims 11 and 19, the use of the parenthetical text is indefinite because it is unclear if the parenthetical text is further limiting the invention.

7. Claim 13 provides for the use of the sensor of claim 1, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim 13 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

8. In claim 17, the use of "preferably atmospheric air" renders the scope of the claim unclear as it is unclear if this limitation is further limiting the claim.

9. With respect to claim 20, the acronym NEMCA is never defined in the claim.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-9, 12-17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brosda et al (USP 6,355,151) in view of Inaba et al (US 2003/0121801) and Inoue et al (USP 6,136,170).

12. With respect to claim 1, Brosda disclose an organic contaminant molecule sensor (propane) comprising an electrochemical cell comprising a solid state anion conductor 1 constructed out of zirconia, which the present invention evidences inherently possesses a oxygen anion critical temperature (specification p. 3, l. 31 - p. 4, l. 3). Brosda discloses the presence of two measurement electrodes (2, 2a) having differing catalytic activities formed on a first surface of the conductor where the electrodes are constructed of platinum and platinum alloys which are inherently capable of catalyzing the oxidation of an organic contaminant (as evidenced by applicant's claim 2). Brosda further discloses a reference electrode 9 formed on a second surface of the conductor for exposure to a reference environment. Brosda further discloses a means for controlling the electrical current flowing between the reference electrode and each of the

measurement electrodes (U_{p1}, U_{p2}), which would inherently control the flux of oxygen anions flowing between the reference electrode and each of the measurement electrodes, and a means for monitoring the potential difference U_2 between the two electrodes of differing activities. See fig. 2 and col. 4, l. 34 - col. 5, l. 7. Brosda did not explicitly disclose that the second measurement electrode is catalytically inactive. However, because the two measuring electrodes are of differing catalytic activity (col. 4, ll. 41-45), one of the electrodes would inherently have to be at least less catalytic than the other measurement electrode. Inaba teaches a similar sensor relying on a potential difference between two measurement electrodes (fig. 2) and explicitly suggest that one of the electrodes 24 should be active to the hydrocarbon gas while the other electrode 22 is an oxide-containing inactive electrode (par. 0094 and 0095). Because the electromotive force difference seen for electrodes of 2 and 2a between these electrodes would be at least a function of their catalytic activity, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Inaba and utilize an inactive electrode for one of electrodes 2 and 2a so that the electromotive force U2 measured across 2 and 2a is greater. Brosda also did not explicitly disclose the presence of a means for controlling and measuring the temperature of the cell. However, Inoue teaches that it is conventional in the art to both measure and control the temperature of a solid electrolyte based sensor so that the sensor is maintained at its optimal temperature and so that the measurements can be corrected for unavoidable temperature alterations. See col. 17, l. 53 - col. 18, l. 7. It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Inoue for the sensor of Brosda so that the temperature of the sensor can be accurately controlled and accounted for. With respect to the various voltage

measurements that would be seen by the claimed sensor, none of these limitations appear to further define the actual sensor. However, even if the examiner were to give these limitations further due consideration, fig. 1 of Brosda would appear to show that the voltage across 2 and 2a assumes a base value (V_b) of 0 mV in the absence of the organic contaminant, and the difference between the two electrodes at high levels of contaminant (V_{sense}) and the absence of contaminant is indicative of the presence of organic contaminant molecules in the monitored environment.

13. With respect to claim 2, see Brosda col. 4, ll. 41-45.

14. With respect to claim 3, Inaba discloses that Pt-Au alloys have high activity to hydrocarbons (par. 0012), and would represent an obvious choice of Pt alloy for the active electrode of Brosda.

15. With respect to claims 4 and 5, because the reference electrode must be responsive to oxygen concentration and must be capable of dissociating oxygen for the pump cells of 2 and 9 and 2a and 9, the use of platinum or platinum alloys would have been an obvious choice of material for the reference electrodes of Brosda (see Inaba for example).

16. With respect to claim 6, see Brosda col. 2, ll. 38-40. Yttria is a conventional stabilization agent for zirconia.

17. With respect to claims 7 and 8, electrode 9' would read on the defined counter electrode. Although not specified as being a counter electrode, the term "counter" only defines the intended function of the electrode and doesn't further define its structure. The use of platinum or platinum alloys for this electrode would have been obvious for the same reasons discussed above for claims 4 and 5.

18. With respect to claim 9, element 4 of Brosda is an air passage.

19. With respect to claim 12, see Inoue col. 17, l. 53 - col. 18, l. 7.

20. With respect to claim 13, this claim set forth no actual steps of the use of the sensor (see the 112 rejection above) and doesn't appear to further define the actual sensor. Moreoever, monitoring the unburned hydrocarbons in a low oxygen exhaust gas (as Brosda teaches) would read on the defined monitored process environment.

21. With respect to claims 14, 16, and 17 (those limitations not already covered above), Brosda shows a calibration curve for the sensor in fig. 1. When the propane is 0 vol%, the base voltage (V_b) for the sensor appears to be around 0 mV while the sensor gives non-zero voltage values (V_{sense}) in the presence of the organic contaminant. One possessing ordinary skill in the art would recognize that any measure of propane for the sensor of Brosda should rely on the value of V_{sense} minus the V_b because the V_b should be subtracted to correct for any baseline offset in the sensor response. Although Brosda does not appear to show any offset in its response (hence $V_{sense} - V_b = V_{sense}$), one possessing ordinary skill in the art would recognize that not every combination of measurement electrodes and voltages applied to those electrodes would necessarily give 0 mV for V_b every time and V_b should still be subtracted from the V_{sense} to make sure that no offset affects the measured response.

22. With respect to claim 15, although Brosda doesn't specify the level of current being applied to the sensor, finding the amount of voltage (U_{p1}, U_{p2}) to apply (and hence the level of current as well) that give the desired potential difference between electrodes 2 and 2a would have required only routine skill in the art.

23. With respect to claim 20 (those limitations not covered above), because Brosda is operated in a manner analogous to that of the present invention, the NEMCA effect would

presumably be inherent for the sensor of Brosda. Alternatively, because Brosda in view of Inaba and Inoue set forth all the structure of the claim, whether or not the NEMCA effect is realized would then presumably depend on how the sensor is operated and controlled. Hence, whether or not the NEMCA effect is realized depends on the intended use of the sensor and doesn't further define the actual sensor itself.

24. Claims 10, 11, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brosda in view of Inaba and Inoue as applied to claims 1 and 14 above, and further in view of Gür et al (USP 5,827,415).

25. The references set forth all the limitations of the claims, but did not explicitly recite the use of a solid state source of oxygen. Gür teaches that using atmospheric sources of oxygen for the reference electrode (as Brosda does) has a number of limitations including that they are prone to leakage and require gas-tight sealing (col. 2, l. 61 - col. 3, l. 9). Gür suggests the use of solid state sources of oxygen (including $Cu/Cu_{+}O$ and Pd/PdO) to avoid the need for this gas-tight sealing (col. 7, l. 29 - col. 8, l. 23). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Gür for the sensor and method of Brosda, Inaba, and Inoue so as to avoid the need for gas-tight sealing structures.

26. Claims 13-19 in the alternative are rejected over Brosda, Inaba, and Inoue for claims 13-17 and Brosda, Inaba, Inoue, and Gür for claims 18 and 19, in further view of Muroguchi et al (US 2002/0029980).

27. In the rejections above, the examiner was of the position that the limitations drawn to the use of the sensor for a monitored process environment either did not further define the process or read on the use of a sensor in an exhaust gas line. However, even if the examiner were to not

take these interpretations, these claims would be further obvious over Muroguchi et al which teaches that these types of sensors find utility in the semiconductor industry for monitoring the processing conditions of the manufacturing. See par. 0005-0010. Because trace combustion gases need to be detected in various processing industries, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the hydrocarbon sensor of Brosda, Inaba, and Inoue as an analysis means for the processes suggested by Muroguchi to ensure a desired low level of organic contaminants.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAJ K. OLSEN whose telephone number is (571)272-1344. The examiner can normally be reached on M-F 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kaj K Olsen/
Primary Examiner, Art Unit 1795
5/8/2009